In the claims:

1 – 23. (Cancelled)

24. (Previously presented) A fuel cell, comprising:

at least one electrode operatively disposed in the fuel cell; and

an electrolyte in electrochemical contact with the at least one electrode;

wherein the electrode includes a metal oxide film established on a substrate selected from single crystal silicon, polycrystalline silicon, and silicon oxide containing dielectric substrates, the metal oxide film having at least one crack formed therein during a process for forming the metal oxide film, the process comprising the steps of:

preparing a first solution having at least one metal salt dissolved therein;

preparing a second solution having a water soluble polymer dissolved therein;

combining the first solution and the second solution at a predetermined ratio to form a third solution;

depositing a layer of the third solution on the substrate; and

heating the substrate having the third solution layer thereon at a temperature sufficient to oxidize the at least one metal salt to form the solution-based metal oxide film;

wherein the presence of the at least one crack in the metal oxide film enhances the surface area of the metal oxide film for one or more catalytic reactions in the fuel cell.

25. (Previously presented) The fuel cell as defined in claim 24 wherein the electrode is selected from an anode and a cathode.

26. (Original) The fuel cell as defined in claim 24 wherein the first solution comprises at least two metal salts, the at least two metal salts having been dissolved individually into water, and combined at a predetermined ratio to form the first solution.

27. (Original) The fuel cell as defined in claim 24 wherein the second solution comprises the water soluble polymer dissolved in a solvent.

28. (Previously presented) The fuel cell as defined in claim 27 wherein the solvent is at least one of water or isopropyl alcohol.

29. (Original) The fuel cell as defined in claim 28 wherein the water soluble polymer is polyvinylalcohol.

30. (Previously presented) The fuel cell as defined in claim 29 wherein the at least one metal salt is at least one of cerium nitrate, samarium nitrate, gadolinium nitrate, praseodymium nitrate, cerium chloride, samarium chloride, gadolinium chloride, praseodymium chloride, indium tin oxide, yttria-stabilized zirconia (YSZ), samarium strontium cobalt oxide (SSCO), gadolinium doped ceria, or mixtures thereof.

31. (Previously presented) The fuel cell as defined in claim 24 wherein the at least one metal salt is at least one of acetates, nitrates, halides, and sulfates of at least one of cerium, samarium, indium, gadolinium, praseodymium, yttrium, zirconium, strontium, and cobalt, or mixtures thereof.

32. (Previously presented) The fuel cell as defined in claim 24 wherein the water soluble polymer is at least one of polyvinyl alcohols, starches, hydrocolloids, cellulose ethers, polyethylene oxides, polyacrylates, polyacrylamides, polyamines, polyimines, or mixtures thereof.

33. (Original) The fuel cell as defined in claim 32 wherein the water soluble polymer is polyvinyl alcohol.

34. (Canceled)

35. (Previously presented) The fuel cell as defined in claim 24 wherein the predetermined ratio is varied to achieve a viscosity of the third solution which is sufficient for deposition by at least one of spin coating, spray coating, or dip coating.

36. (Previously presented) The fuel cell as defined in claim 24 wherein the depositing step is accomplished by at least one of spin coating, spray coating, or dip coating.

37. (Original) The fuel cell as defined in claim 24 wherein the heating step is accomplished at a temperature ranging between about 400°C and about 1200°C.

38. (Previously presented) The fuel cell as defined in claim 24 wherein the solution-based metal oxide film has a thickness ranging between about 0.05 μm and about 5.0 μm.

39. (Original) An electronic device, comprising:
a load; and
the fuel cell of claim 24 connected to the load.

40. (Previously presented) A method for using the fuel cell as defined in claim 24, comprising the step of:

operatively connecting the fuel cell to at least one of an electrical load and an electrical storage device.

41. (Previously presented) The method as defined in claim 40 wherein the at least one electrode is one of an anode or a cathode.

42 – 48. (Cancelled)

49. (Previously presented) A fuel cell, comprising:

at least one electrode operatively disposed in the fuel cell; and

an electrolyte in electrochemical contact with the at least one electrode;

wherein the electrode includes a film consisting essentially of a metal oxide established on a substrate, the film having at least one crack formed therein during a process for forming the film, the process comprising the steps of:

preparing a first solution having at least one metal salt dissolved therein;

preparing a second solution having a water soluble polymer dissolved therein;

combining the first solution and the second solution at a predetermined ratio to form a third solution;

depositing a layer of the third solution on the substrate; and

heating the substrate having the third solution layer thereon at a temperature sufficient to oxidize the at least one metal salt to form the solution-based metal oxide film;

wherein the presence of the at least one crack in the film enhances the surface area of the film for one or more catalytic reactions in the fuel cell.

50. (Previously presented) A fuel cell, comprising:

at least one electrode operatively disposed in the fuel cell; and

an electrolyte in electrochemical contact with the at least one electrode;

wherein the electrode includes a metal oxide film established on a substrate selected from alumina and sapphire, the metal oxide film including at least one crack formed therein during a process for forming the film, the process comprising the steps of:

preparing a first solution having at least one metal salt dissolved therein;

preparing a second solution having a water soluble polymer dissolved therein;

combining the first solution and the second solution at a predetermined ratio to form a third solution;

depositing a layer of the third solution on the substrate; and

heating the substrate having the third solution layer thereon at a temperature sufficient to oxidize the at least one metal salt to form the solution-based metal oxide film;

wherein the presence of the at least one crack in the metal oxide film enhances the surface area of the metal oxide film for one or more catalytic reactions in the fuel cell.